

COASTAL OCEANOGRAPHY AND CLIMATOLOGY NEWS

Recent Events in United States Coastal Waters

Volume 4 Number 4

Summer 1982

The purpose of Coastal Oceanography and Climatology News (COCN) is to provide timely dissemination of information concerning environmental events and research activities in U.S. coastal waters. We will publish brief articles describing recent events and unusual phenomena. Also, announcements of cruises, meetings, and investigations will be posted. Since the emphasis is on timely reporting of early results, observations older than six months will not be accepted unless they are used as a basis for comparison with more recent observations. The newsletter is not a substitute for publication in professional journals or presses. COCN is not copyrighted, and any reference to material printed in the newsletter must be approved by the author.

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Environmental Events

Area of Hypoxic Bottom Water Found in Northern Gulf of Mexico

During a recent Southeast Area Monitoring and Assessment Program (SEAMAP) cruise by the FRV *Oregon II* to assess shrimp and bottomfish distribution and abundance, an area of low dissolved oxygen was found in bottom water along the coast of Louisiana. The research vessel was trawling and collecting environmental data in an area bounded by the 9 m and 91 m depth contours and extending from the Florida-Alabama state line to the United States-Mexico border during June 1-July 15.

The area of low oxygen concentration (Fig. 1) was found in depths of 9-46 m along the coast from 89° 30.5'W to 91° 30.1'W. The inshore and western boundaries are poorly defined because of operational limits of the cruise. However, based on trawl catch data from a chartered vessel fishing just to the west of our study area, we suspect that the low oxygen area may have extended farther westward than 91° 30.1'W.

Oxygen samples were collected at each station at the surface, mid-depth, and bottom. Low oxygen levels of less than 1.4 ml • l⁻¹ (2 ppm) were confined to the narrow coastal zone and a relatively thin bottom layer. No evidence of low concentrations was found in the mid-depth samples, regardless of the bottom depth.

Sea surface temperature contours from June 24 (Fig. 2), derived from data from the Advanced Very High Resolution Radiometer (AVHRR) on a polar-orbiting satellite, showed surface temperatures in the region of the area of low oxygen were unusually high (31.5° C). Later orbits (July 1 and 2) showed that the high temperature areas had expanded to the south and then advected westward. The warm surface layers may have originated in shallow bays and estuaries and then spread offshore. Such extremely warm layers could establish strong stratification in the water column, a barrier to vertical mixing that could block oxygenation of the bottom water.

After the biological sampling was completed, the vessel sampled dissolved oxygen and temperatures along the 9 m depth contour at 37 km intervals between 93°W and 89°30'W. Only one station, located at 29°09.5'N and 92°02.6'W, had less than 1.4 ml • l⁻¹ (2 ppm) of dissolved oxygen.

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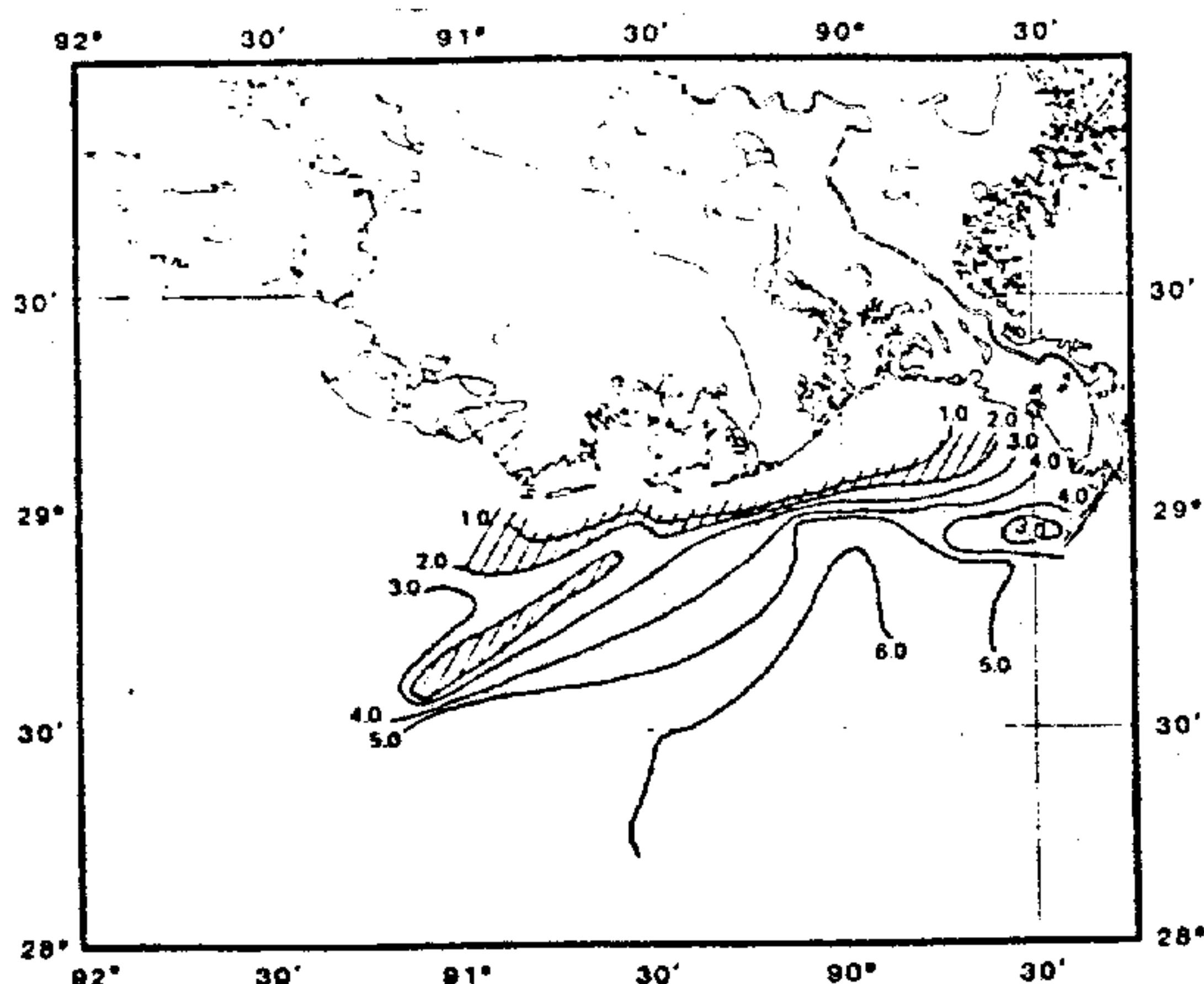


Figure 1. Bottom dissolved oxygen in parts per million (ppm) for a portion of FRV Oregon II Cruise 127, June 15-24, 1982, in the northern Gulf of Mexico. The contour interval is 1 ppm ($1 \text{ ppm} = 0.7 \text{ ml} \cdot \text{l}^{-1}$), and the hatched area is 2 ppm.

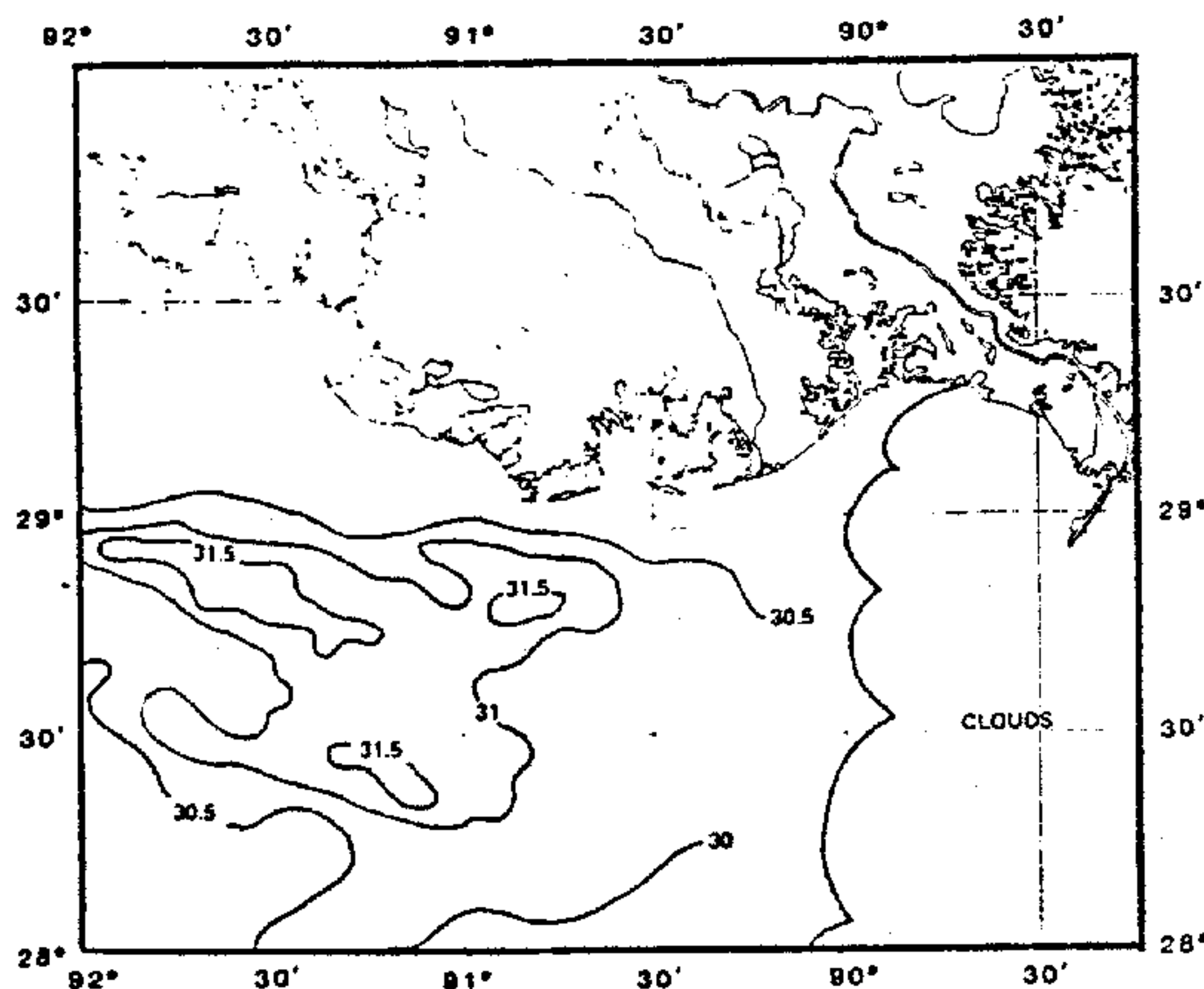


Figure 2. Sea surface temperature ($^{\circ}\text{C}$) in the northern Gulf of Mexico on June 24, 1982, derived from NOAA-6 Advanced Very High Resolution Radiometer (AVHRR). The contour interval is 0.5°C .

During the survey cruise catches from a 12.1 m shrimp trawl normally included 20 or more species of fish and invertebrates. The area of low oxygen (less than $1.4 \text{ ml} \cdot \text{l}^{-1}$) was a notable exception. Here, some fish and/or invertebrates were taken at all trawl stations, but no commercial fish species were found. Bottom-dwelling fish species were reported as part of the catch at only three stations having less than $1.4 \text{ ml} \cdot \text{l}^{-1}$ (2 ppm) of dissolved oxygen. They included one fringed flounder, *Etropus crossotus*; three pancake batfish, *Halieutichthys aculeatus*; two silver conger, *Hoplunnis macrurus*; and one ragged goby, *Bollmannia communis*. All the other fish species taken were pelagic forms, such as harvestfish, *Peprilus paru*; Atlantic

bumper, *Chloroscombrus chrysurus*; and Spanish mackerel, *Scomberomorus maculatus*; probably taken from the surface and mid-water portions of the trawl profile. Crabs were the most commonly taken invertebrate species. These included lesser blue crab, *Callinectes similis*; *Calappa sucata*, *Hepatus epheliticus*, and *Portunis gibbessii*. The other crustaceans taken were *Squilla* sp. and *Sicyonia dorsalis* except at one station with $1.3 \text{ ml} \cdot \text{l}^{-1}$ (1.8 ppm) dissolved oxygen at the bottom, where a number of trachypeneid shrimp were taken.

Based on our data, the area of low oxygen certainly had an impact on demersal fish and invertebrate distribution. Of interest, especially from the commercial fishing point of view, is how the bottom-dwelling species respond to the low oxygen. The inshore section of the Louisiana coast is a nursery area for many estuarine-dependent species, such as shrimp. What effect the low oxygen has on shrimp migration to the offshore region where they spawn is unknown.

It has been known for some time that a "dead area" occasionally occurs off western Louisiana. In 1973, A. Harris investigated this area and reported on its existence to the Louisiana Wildlife and Fisheries Department. National Marine Fisheries Service personnel on a cruise in the mid-1970s found a large area where no bottom-dwelling species were caught in their trawls.

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Spring Coastal Climate Review

March was a typical spring month with warming temperatures and substantial snow melt. The snow melt, together with above normal precipitation, caused flooding in many areas, particularly in the Midwest just south of the Great Lakes. The West Coast and Hawaii also received above average precipitation, and some crop damage occurred in the island-state. Much of the East Coast was drier than normal, and parts of the South received less than 50% of normal rainfall amounts. Florida, however, received precipitation far above normal. Tempera-